1958

Effect of age upon achievement of boys and girls in the seventh and eighth grades at the Needham School in Lodi, California

Aaron Clemens Heinrich
University of the Pacific

EFFECT OF AGE UPON ACHIEVEMENT OF BOYS AND GIRLS IN THE SEVENTH AND EIGHTH GRADES AT THE NEEDHAM SCHOOL IN LODI, CALIFORNIA

A Thesis

Presented to

the Faculty of the School of Education

College of the Pacific

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

---

by

Aaron Clemens Heinrich

July 1958

TABLE OF CONTENTS

LIST OF TABLES

TABLE PAGE

CHAPTER I

INTRODUCTION TO THE STUDY

It is the primary function of the public schools to provide opportunity for the normal growth and development of the maximum potential in every child. In order to do this the school must not only strive to understand individual differences in children but must also determine, as precisely as possible, at what stage of development children can profit most from the various learning experiences which are provided in the school.

Sex differences are also of major concern to the educator. Information from child growth and development studies indicates that girls reach physical maturity earlier than boys.[1] This makes teachers wonder whether physical and mental growth develop together. If this is true boys may not be able to compete favorably in scholastic achievement with girls of the same age.

I. THE PROBLEM

Statement of the problem. The problem for this study may be stated in two questions: (1) What effect does

---

[1]Marian E. Breckenridge and E. Lee Vincent, Child Development Physical and Psychological Growth Through The School Years (Philadelphia: W. B. Saunders Company, 1949), p. 256.

chronological age have on achievement in reading and arithmetic for boys and girls in the seventh and eighth grades at the Needham School in Lodi, California? (2) Are boys in Grades VII and VIII able to do as well scholastically as girls of the same age working in the same grade?

Purpose of the study. The purpose of this study is to compare the scholastic achievement of a group of children who are young for their grade placement, less than twelve and thirteen years of age in Grades VII and VIII, respectively, with children who are older, and to determine if there is a valid reason for requiring a child to take an extra year of elementary school work because he happens to be in the youngest quartile age group of his class.

Traditionally, children are admitted to school on the basis of chronological age. In the State of California children shall be admitted to kindergarten and Grade I if they will be four years and nine months and five years and nine months of age, respectively, on or before September 1.[2]

---

[2]State of California, Department of Education, California Administrative Code, Title 5, Article I, Sections 8503 and 8505 (Sacramento: Division of Administrative Procedure).

A child who enters the first grade at the age of five years and nine months or older, and who is moved to a higher grade each succeeding year, will be eleven years and nine months of age or older when he is in Grade VII, and twelve years and nine months of age or older when he is in Grade VIII.

The median age for Grade VII is twelve years and four months. Children who are more than three months younger than the median age are considered young for their grade placement in the Lodi elementary schools. A child who is young for his grade placement and whose academic achievement is below his grade level is often retained for one year on the premise that an additional year of maturity will enable him to be more successful in his academic achievement. It is feared that children who are presented with situations beyond their abilities may not be able to realize their maximum achievement capacity. A statement in the "Handbook for Teachers" reads as follows:

> . . . Research gives ample evidence that neither wholesale retentions nor universal promotions are desirable but that each individual case must be carefully considered in the light of many factors. In certain specific cases children definitely benefit from working on the same grade level for another year.
>
> . . . . . .
>
> If a child is young for his grade and is doing poor work in comparison with the average, even though

> he may be working up to his ability level, careful consideration should be given to having the child continue in the same grade for another year. This will give him an additional year of maturity.[3]

Delimitation of the problem. This study was limited to the boys and girls who were enrolled at the Needham School in Lodi, California during the 1956-57 school term and who were chronologically between the ages of eleven years and nine months and twelve years and nine months in Grade VII and between the ages of twelve years and nine months and thirteen years and nine months in Grade VIII. There were forty-three pupils within the above age groups who were not included in the study since no standardized test results were available. In addition, there were fourteen pupils excluded from this study who were in a class for the mentally retarded.

II. SOURCE OF DATA

The Lodi elementary schools use the cumulative guidance record folder prepared by the California State Department of Education. A record is started for each child when he first enters school and is built up progressively throughout a child's school career. On this

---

[3]Lodi Elementary Schools, "Handbook for Teachers" (Lodi, California: 1957), p. 22.

folder are recorded standardized test results, health data, family history, and various personal data pertinent to the growth and development of the child. These data were available for use in this study.

III. DEFINITIONS OF TERMS

In Grade VII the pupils were divided into the following groups according to their chronological age as of September 1, 1956:

Young. The young group ranged from eleven years and nine months to eleven years and eleven months.

Low middle. The low middle group ranged from twelve years to twelve years and two months.

High middle. The high middle group ranged from twelve years and three months to twelve years and five months.

Older group. The older group ranged from twelve years and six months to twelve years and eight months.

In Grade VIII the same group arrangement was used except that the children in each group were one year older.

Grade placement. The grade in which a child works.

Median age. The median age for Grade VII is twelve years and four months.

The legal age for entrance to Grade I in California is five years and nine months.[4] A child who enters school at five years and nine months and is passed to the next grade each year will be eleven years and nine months when he enters Grade VII, and twelve years and nine months when he reaches Grade VIII. The median age for Grade VII is, therefore, 12.4. This is the age halfway between the beginning age for Grade VII and Grade VIII.

Median age. The median age for Grade VIII is thirteen years and four months.

Chronological age. The computation of a person's age in years and months from birth.

IV. STATEMENT OF PROCEDURE

The report of this study involves the following procedure. The introductory chapter presents a statement of the problem, discusses the importance of the problem, and lists the source of information. Chapter II is a review of current literature and related studies. A description of the study and procedure in collecting and classifying the data is included in Chapter III. Chapter IV contains a

---

[4] State of California, Department of Education, ibid.

presentation and interpretation of the data and the final chapter contains a general summary and conclusions.

CHAPTER II

REVIEW OF THE LITERATURE

Much has been written on age limit for admission to kindergarten and Grade I as well as sex differences in primary school children; however, only a few studies relative to the way chronological age has affected scholastic achievement in Grades VII and VIII are available. Educators who have made studies in this field are not in agreement in their conclusions.

A brief account of available literature will be given under the following categories: (1) Children who are young for their grade placement because they enter Grade I before they are six tend to have more scholastic, social, and emotional difficulty than children who are six years or older when they first enter school; (2) children who are young for their grade placement may do very well in school, and therefore, chronological age has no significant effect on achievement and total school adjustment, providing they have reached sufficient maturity and readiness as shown on individual intelligence tests; (3) chronological age has a greater effect on boys in relation to scholastic achievement than on girls.

I. CHRONOLOGICAL AGE AFFECTS SCHOLASTIC ACHIEVEMENT

John J. Forester reports on a study in which it was found that the factor of chronological age has some bearing on success in school.[1] He writes:

> A study made recently in Montclair, New Jersey, shows that children entering kindergarten ought to be five years of age or older chronologically, if they are to have a happy and profitable school career.[2]

The records of five hundred pupils were studied as they progressed from kindergarten through high school. The children were classified into six age groups. Each of the six age groups was divided into mental age groups.

The study showed that children with an Intelligence quotient of 121 or above and who were five years and six months old or older when they entered kindergarten excelled generally throughout their school careers. The children with an Intelligence quotient of 121 or above but who were below four years and six months when they entered kindergarten "met with varying difficulties from the junior high school period on."[3] Fifty per cent of the children who were younger than four years and six months when they

---

[1]John J. Forester, "At What Age Should a Child Start School?" The School Executive, 74:80-1, March, 1955.

[2]Ibid., p. 80.

[3]Ibid., p. 81.

entered kindergarten made only average grades. Teachers reported them to be physically immature and emotionally unstable. They were seldom asked to be leaders.

In another study, Inez B. King[4] compared the achievement results on the Stanford Achievement Test of a group of fifty-four sixth grade children whose mean chronological age was five years ten months with the achievement of a group of fifty children whose mean chronological age was six years seven months. The younger group of children were five years eight months to five years eleven months old when they entered Grade I. The entrance age in Grade I for the older group ranged from six years and five months to six years and eight months. The Intelligence quotients in these two established groups ranged from 90 to 110 with a mean of 102.04 for the younger group as compared to 100.08 for the older group. Her research showed that the mean score on the achievement tests of the older group was slightly more than one year and four months higher than that of the younger group. This would seem to indicate that there is a significant difference in achievement of the two groups. King's

---

[4]Inez B. King, "Effect of Age of Entrance Into Grade I Upon Achievement in Elementary School," Elementary School Journal, 55:331-36, February, 1955.

conclusion is as follows:

> This study would seem to indicate that having attained a few additional months of chronological age at the beginning of Grade I is an important factor in a child's ability to meet imposed restrictions and tensions that the school necessarily presents.[5]

Lowell Burney Carter,[6] in a recent study, compared the achievement of fifty under-age children with fifty normal age children in the Austin, Texas public schools. There was an equal number of boys and girls in each group and all had an Intelligence quotient of 112 as measured by the New California Short-Form Test of Mental Maturity.

The study was carried on for a four-year period beginning with Grade II. The following are some of his conclusions: (1) older children appear to have an advantage in the same school experience; (2) the under-age pupils making lower scores on the first achievement test did not overcome the inferior position; and (2) 87 per cent of the under-age children do not equal the achievement of normal-age children.

---

[5] Ibid., p. 336.

[6] L. B. Carter, "The Effect of Early School Entrance on the Scholastic Achievement of Elementary School Children in the Austin Public Schools," Journal of Educational Research, 50:91-103, October, 1956.

Clyde Baer[7] made a comparison of the school progress and personal adjustment of under-age and over-age pupils of comparable intelligence during eleven years in school. The under-age children were chronologically between the ages of four years ten months and five years, but had a mental age of five as determined by a test. The over-age children were between five years three months and five years four months old.

A comparison of the school marks of the two groups of children revealed that in the elementary school the over-age pupils consistently were marked higher than the under-age pupils. The girls were marked consistently higher than boys, but the difference tended to be smaller as the higher grade levels were reached. A comparison of the marks made at the high school level showed that the over-age students were again more successful.

On a comparison of the achievement tests in reading, arithmetic, spelling, language, science, and social science, the over-age student also made higher scores. The study seemed to show that the over-age children made better school progress than did the under-age children. However,

---

[7]Clyde Baer, "A Comparison of the School Progress and Social Adjustment of Underage and Overage Pupils of Comparable Intelligence during Eleven Years in School," Kansas City, Missouri: Kansas City Public Schools (n.d.).

most of the under-age children made acceptable school progress. As a group the under-age children made average marks on subjects and average scores on achievement tests.

Summary. These three studies seem to point out that the older children were generally more successful in school than children who were young for their grade placement.

The older children made somewhat higher marks in school, higher scores on achievement tests, and were generally better able to cope with the school problems in all grades from kindergarten through high school.

II. YOUNG CHILDREN AND SCHOOL SUCCESS

The results of a ten-year research in the public schools of Brookline, Massachusetts by James R. Hobson[8] show that under-age children are capable of doing successful or superior school work; however, he recommends that only those children be admitted to kindergarten and Grade I who have a mental age of five years and two months and six years and two months, respectively.

---

[8]James R. Hobson, "Mental Age As a Workable Criterion for School Admission," Elementary School Journal, 48:312-21, February, 1945.

A comparison of scholastic achievement of under-age groups in Grades VII and VIII with all other children shows that in Grade VII the under-age children made an average achievement score of 9.0. The other children's average test results were 8.5. In Grade VIII the difference was even greater, 9.7 for the under-age children and 9.0 for all others.

Vera V. Miller reports on a number of studies considering the under-age child in the Evanston, Illinois, public schools.[9] She says, "Blanket statements that children young for their grade placement 'always have difficulty in school' have wide acceptance and need to be carefully examined."[10]

The Metropolitan Reading Readiness Test was administered to 480 kindergarten children, and the results show that the largest per cent of children who were low in reading readiness and, therefore, potential failures were not those children who were young and admitted to kindergarten because they qualified on the basis of the test, but rather those children who were admitted to kindergarten because they qualified on the basis of chronological age.

---

[9]Vera V. Miller, "Academic Achievement and Social Adjustment of Children Young for Their Grade Placement," The Elementary School Journal, 57:257-63, February, 1957.

[10]Ibid., p. 257.

In another study the Stone-Webster Reading Test was given to 306 first grade pupils in the Evanston School. The results of these tests showed that "the young child tested for admission constituted the only age group which had no scores among the lowest quarter. In other words, none were reading failures."[11]

In a sampling of intermediate grade levels, Miller reports that out of 665 fifth grade children, thirty-seven were children who were young for the grade and who qualified for admittance to kindergarten on the basis of the test, accelerated by double promotion, or came from other school systems. Forty per cent were among the top fourth in the district in total achievement; whereas, only 6 per cent were below average.[12] She writes:

> These studies in toto seem to point to the conclusion that chronological age is not so important in the academic, social, and emotional adjustment of the child as many people think. The under-age child may do very well in school. Our data indicate that, under the proceedings outlined, children young for their grade can be identified and have a good chance for success, not only academically, but socially as well, and that their superiority becomes even clearer as they progress through the grades.[13]

---

[11] Ibid., p. 259.

[12] Ibid., p. 260.

[13] Ibid., p. 262.

Summary. These studies seem to point out that the most important factor in determining success or failure in school is not chronological age but mental age.

A child who is four years and six months of age or older and who has a mental age of five years and two months when he enters kindergarten has an excellent chance of being successful in school.

The most difficult period is likely to be in the primary grades. By the time a child is in Grade IV, two or three months in chronological age is negligible. These studies seem to indicate that children who have been carefully screened in terms of high mental age, emotional maturity, and physical development are inadequately served if they have to wait another year before being admitted to school.

III. SEX DIFFERENCES AND SCHOLASTIC ACHIEVEMENT

Frank A. Pauly[14] emphasizes the importance of sex differences in a report on studies made in the Tulsa, Oklahoma public schools over a period of ten years. He states that because of the slower maturation of boys they

---

[14]Frank A. Pauly, "Sex Differences and Legal School Age," Journal of Educational Research, 45:1-9, September, 1951.

should be admitted to Grade I three or more months later than girls. He says:

> Many children are not ready for the traditional first grade of public school when they are chronologically approaching six years of age. Particularly is this true of boys. Boys usually develop in nearly all respects more slowly than girls. Much of the research in sex differences indicates that girls should be admitted at least three or more months younger than boys.[15]

Frank Pauly also points out that psychologists are agreed girls reach adolescence and maturity earlier than boys, and that many states considered eighteen and twenty-one the minimum legal ages for marriages of girls and boys. If eighteen and twenty-one is assumed as legal maturity for girls and boys, then proportionally a boy of seven is about at the same stage of maturity as a girl of six. Mental and physical growth tend to develop together; therefore, boys are not able to compete favorably with girls in scholastic achievement at the same age level.[16]

A study of 28,610 children in 1945 and 30,446 in 1949 revealed that boys were 1.8 months older than girls in Grade VII and 1.77 months older in Grade VIII. The average chronological age in all grades, kindergarten through twelve, was 1.8 months older for boys than for girls.[17]

---

[15] Ibid., p. 1.

[16] Ibid., p. 4.

[17] Ibid., p. 5.

Lowell Burney Carter compared the achievement of fifty boys and girls who were admitted to Grade I before they were six years of age with fifty children who were older than six when they first entered the Austin, Texas public schools. He writes:

> The factor of chronological age has more effect on boys in relation to academic achievement than on girls. The under-age boys made lower scores and fewer higher scores than the under-age girls.[18]

Douglas reports on ten studies relative to the respective achievement of boys and girls in high school mathematics. He found:

> . . . in spite of the fact that girls usually make higher average marks in school and furnish a low percentage of failures in mathematics, boys make better scores on mathematics tests than do girls of the same grade.[19]

Summary. The studies reviewed in this area point out that boys mature more slowly than girls and, therefore, are not able to compete favorably in scholastic achievement with girls of the same age. It was found in a study of about thirty thousand children in Grades VII and VIII that the boys were about 1.8 months older than girls.

---

[18]Carter, op. cit., p. 102.

[19]Harl R. Douglas, "Sex Differences in Secondary School Mathematics," The Mathematics Teacher, 30:21-22, January, 1937.

In another study it was found that boys made better scores on mathematics tests than girls of the same age in the same grade.

CHAPTER III

PROCEDURES USED IN THIS STUDY

Purpose and procedures of the chapter. The purpose of this chapter is to give a brief background on the children of the Lodi Elementary School District in Lodi, California, to give a brief description of the study, and specifically to identify the seventh and eighth grade pupils who are the subjects of this investigation.

Data on the city and school population of Lodi. The Lodi District Chamber of Commerce in its 1957 "Industrial Survey Summary Report" states that the City of Lodi had an estimated population of 18,500 in July, 1957. The population of Lodi is predominantly Caucasian. According to the 1950 United States Census, only 201 were listed as non-white. The median school years completed by persons twenty-five years or older was 9.3.[1]

During the 1956-57 school term, there were 2,403 children enrolled in the city's five public elementary schools.[2] There were three parochial schools in operation

---

[1]Lodi District Chamber of Commerce, "Standard Industrial Survey Summary Report" (Lodi, California: Lodi District Chamber of Commerce, 1957).

[2]Lodi Elementary School District Assistant Superintendent's Office, Student Enrollment and Registration Records (Lodi, California: 1956-57).

with approximately 655 children in Grades I through VIII.[3] In addition, a part of the City of Lodi is in the Woods Elementary School District, and approximately 460 elementary children were enrolled at the Woods School.[4] All of the 468 seventh and eighth grade pupils attending public school in Lodi Elementary School District were enrolled at the Needham School.

Description of the study. It was decided to make a study in which the scholastic achievement of four groups of children enrolled in Grades VII and VIII in the Needham School during the 1956-57 school year were compared. The criteria for comparison were the reading and arithmetic scores on standardized achievement tests.

Standardized tests used. The California Achievement Test[5] is administered to all elementary school children each year beginning in Grade III. The California Short-Form Test

---

[3]Enrollment figures were obtained by telephone from the following: (1) St. Anne's School, Office of the Principal, Lodi, California; (2) St. Peters Lutheran School, Office of the Principal, Lodi, California; and (3) Seventh Day Adventist Elementary School, Office of the Principal, Lodi, California.

[4]Woods Elementary School District Superintendent's Office, Student Enrollment and Registration Records (Woodbridge, California: 1956-57).

[5]Ernest W. Tiegs and Willis W. Clark, California Achievement Tests, Forms AA and BB (Los Angeles: California Test Bureau, 1950).

of Mental Maturity[6] is given to the children in Grades IV and VII. Test scores, as well as information about the family and a child's physical, mental, educational, and social history, are recorded on the cumulative guidance record which is kept for each child who enrolls in the Lodi elementary schools. These data were available for use in this study.

Data collected. The following information about each child was recorded: (1) Chronological age as of September 1, 1956; (2) sex; (3) Intelligence quotient; (4) reading grade placement; (5) arithmetic grade placement; and (6) the number of years the child spent in school, exclusive of kindergarten.[7]

Identification of students. Table I presents an age-group distribution of the 425 students for whom sufficient data is available.

There were 147 boys and 168 girls for whom complete records were available, and six boys and nine girls for whom achievement test scores were available, but not Intelligence quotient scores. This is a total of 153 boys and 177 girls.

---

[6]Elizabeth T. Sullivan, and others, California Short-Form Test of Mental Maturity, Elementary Grades, S-Form (Los Angeles: California Test Bureau, 1950).

[7]Appendix, p. 60

TABLE I

DISTRIBUTION OF 425 SEVENTH AND EIGHTH GRADE PUPILS IN SIX AGE GROUPS AT THE WEEDHAM SCHOOL, LODI, CALIFORNIA, AS OF APRIL, 1957

Groups	Seventh Grade Boys	Eighth Grade Boys	Total Boys	Seventh Grade Girls	Eighth Grade Girls	Total Girls
Very young, not included	7	7	14	11	9	20
Young	11	9	20	20	16	36
Low middle	17	20	37	29	32	61
High middle	33	24	57	22	22	44
Older	18	21	39	13	23	36
Very old, not included	23	20	43	8	10	18
Totals	109	101	210	103	112	215

All were chronologically between the ages of eleven years and nine months and twelve years and nine months in Grade VII, and between twelve years and nine months and thirteen years and nine months in Grade VIII. These 330 pupils were included in the study. Also enrolled at the Needham School but not included were fourteen boys and twenty girls who were younger than the age requirement, and forty-three boys and eighteen girls who were older than the age limit set.

There were forty-three children who had enrolled at the Needham School after the tests were given in the fall of 1956 for whom insufficient data was available. This accounts for all of the 468 seventh and eighth grade pupils enrolled at the time the data for this study was completed in April, 1957.

Four age groups. Table I, page 23, shows that the children were divided into four groups according to their chronological age. These are referred to as the young, low middle, high middle, and older groups. In each group the chronological age difference was no greater than three months.

Three ability groups. Table II shows that three ability groups for each age group were formed. In the low group were all children with an Intelligence quotient of 93 or less. The middle group constituted those children

TABLE II

ABILITY DISTRIBUTION OF 330 PUPILS ENROLLED IN THE NEEDHAM SCHOOL IN LODI, CALIFORNIA, AS OF APRIL, 1957

Ability Groups		Young Group	Low Middle Group	High Middle Group	Older Group	Total
Low Group 78-93 I.Q.	Boys	1	2	8	9	20
	Girls	3	5	7	3	18
Middle Group 94-106 I.Q.	Boys	9	11	20	13	53
	Girls	12	15	16	9	52
High Group 107 I.Q.	Boys	10	22	26	16	74
	Girls	19	38	19	22	98
I.Q. Not Available	Boys	0	2	3	1	6
	Girls	2	3	2	2	9
Totals	Boys	20	37	57	39	153
	Girls	36	61	44	36	177

with an Intelligence quotient of from 94-106. The top group had an Intelligence quotient of 107 or above.

There were 330 children in this study for whom Intelligence quotient scores were available. Thirty-six, or about 11 per cent, were in the low ability range. Approximately 32 per cent were in the middle ability group. The highest ability group was the largest group with about 52 per cent of the students.

Age-group distribution. Table III shows the number of children in each age group. Out of a total of 330 students, fifty-six, or 16.9 per cent, were in the young group; ninety-eight, or 29.6 per cent, were in the low middle group; one hundred one, or 30.6 per cent, were in the high middle group; and seventy-five, or 22.7 per cent, were in the older group.

Differential in number of pupils in each age group. Normally there should be an equal number of children in each age group. The difference in the number of pupils in the young group as compared to the low middle group in Table III is accounted for as indicated in Table IV, page 28.

An examination of the records of the seventh and eighth grade pupils not included in this study because they were either too old or too young, shows that seven boys and six girls, who were between the ages of twelve years and nine months and thirteen years, were retained once in their

TABLE III

NUMBER AND PER CENT OF 330 PUPILS IN EACH OF FOUR AGE GROUPS ENROLLED AT THE NEEDHAM SCHOOL, IN LODI, CALIFORNIA, AS OF APRIL, 1957

Groups	Number of students	Per cent
Young	56	16.9
Low middle	98	29.7
High middle	101	30.6
Older	75	22.7
Total	330	99.9

TABLE IV

DISTRIBUTION OF FORTY-NINE PUPILS NOT INCLUDED IN THIS STUDY BUT ENROLLED IN THE LODI ELEMENTARY SCHOOLS IN LODI, CALIFORNIA, AS OF APRIL, 1957

Chronological Ages of Children Too Old or Too Young and Not Included in this Study	Number of Children in Each Age Group			
	Young	Low Middle	High Middle	Older
Seventh grade pupils retained 12 yrs. 9 mos. to 12 yrs. 11 mos.	13			
Sixth grade pupils retained 11 yrs. 9 mos. to 11 yrs. 11 mos.	13			
Seventh grade pupils too old 12 yrs. 9 mos. to 12 yrs. 11 mos.	4			
Sixth grade pupils too old 11 yrs. 9 mos. to 11 yrs. 11 mos.	4			
Eighth grade pupils too young				15
Number of students in each group included in study	56	98	101	75
Totals	90	98	101	90

school careers. If these children had not been retained they would now be included in the young eighth grade group. It can also be assumed that there were thirteen children in the sixth grade who would be in the older seventh grade group if they had not been held.

There were four children between the ages of twelve years and nine months and thirteen years in Grade VII because they started first grade when they were six years and nine months old or older. If these children had started school before they were six years and nine months of age, they would have been included in the young eighth grade group. It is also assumed that there were four sixth grade children who started first grade late and, therefore, were excluded from young seventh grade group.

Table IV, page 28, shows that there were thirty-four children who were not included in this study because they had been retained or started school late. If these thirty-four pupils had been added to the fifty-six included in the young age group a total of ninety pupils could have been accounted for in the young age group.

There were also fifteen eighth grade children not included in the eighth grade groups because they were too young, but they were the same age as the older seventh grade group. If these fifteen children had been added to the seventy-five in the older group, a total of ninety children

could have been accounted for in this age group.

Table III, page 27, shows that there are only fifty-six pupils in the youngest group and only seventy-five pupils in the oldest group, but there are approximately one hundred in each of the two middle groups. This difference is due to the fact that some pupils have been retained; others started school when they were older than the required age for school entrance.

The data presented in Table IV, page 28, shows that the small number of children in these groups are accounted for, but the achievement scores are very likely altered somewhat since not all the children in these age groups attending the Needham School could be included in this study.

Summary. There were 2,403 elementary school children enrolled in the Lodi public schools during the 1956-57 school term. Four hundred sixty-eight of this number were in Grades VII and VIII at the Needham School. The cumulative records of these children revealed that sufficient data for the purpose of this study was available for only 425 pupils. All of the 330 boys and girls between the ages of eleven years and nine months and twelve years and nine months in Grade VII, and thirteen years and nine months and fourteen years and nine months in Grade VIII were included in this study. The children in each grade were divided into

four age groups. These groups were the young, low middle, high middle, and older groups. Each age group was divided into three ability groups.

In Chapter IV a comparison of the scholastic achievement for the four age groups is presented. The criteria for comparison is the California Progressive Achievement Test scores in reading and arithmetic.

CHAPTER IV

PRESENTATION AND INTERPRETATION OF DATA

The purpose of this chapter is as follows: (1) to present a comparison of the scholastic achievement records of four age groups of children in Grades VII and VIII and to interpret the findings in the light of the data presented; (2) to present a comparison of the chronological age and scholastic achievement differences between boys and girls in the same grades.

I. ANALYSIS OF DATA

It has been indicated that the data used for this study were compiled from the achievement records of the cumulative record folders for 330 seventh and eighth grade pupils at the Needham School.

Review of tables introduced in Chapter III. Table I, page 23, shows that there were 153 boys and 177 girls. These were divided into four chronological age groups.

Table II, page 25, shows each age group divided into three ability groups as determined by their Intelligence quotient scores on the California Mental Maturity Test.

Table III, page 27, shows the number of children in each age group.

Table IV, page 28, shows a distribution of forty-nine pupils not included in this study, but enrolled at the Needham School.

Reading and arithmetic achievement score distribution for boys and girls. Table V shows the mean reading and arithmetic achievement scores for each age group of boys and girls in the seventh and eighth grade. These scores seem to show a broken pattern of descending achievement for the older boys and there is some indication that the opposite is true for girls. However, the table shows many inconsistencies.

The seventh grade low middle group of boys, for example, had a mean reading score of 6.9; whereas, the low middle eighth grade boys group had a mean reading score of 9.01. The oldest group of seventh grade boys had a score of 6.9 in arithmetic while the young group of eighth grade boys had an achievement score of 9.02.

Table V also shows that the older eighth grade girls have the highest achievement in reading; whereas, the young girls achieved highest in arithmetic. The older seventh grade girls had the highest score in reading while the low middle group scored highest in arithmetic.

This apparently broken pattern of achievement could be due, in part, to a lack of sufficient numbers in each group. However, when the achievement scores for all boys

TABLE V

MEAN INTELLIGENCE QUOTIENT SCORES AND MEAN ARITHMETIC AND READING GRADE PLACEMENT FOR SEVENTH AND EIGHTH GRADE BOYS AND GIRLS ENROLLED AT THE NEEDHAM SCHOOL, LODI, CALIFORNIA, AS OF APRIL, 1957

	Boys						Girls					
	Seventh Grade			Eighth Grade			Seventh Grade			Eighth Grade		
	Mean I.Q.	Read. G.P.	Arith. G.P.	Mean I.Q.	Read. G.P.	Arith. G.P.	Mean I.Q.	Read. G.P.	Arith. G.P.	Mean I.Q.	Read. G.P.	Arith. G.I.
Young	103	8.40	7.17	112	8.93	9.02	108	7.78	7.14	111	8.47	8.94
Low middle	100	6.90	7.13	112	9.01	8.80	114	7.83	7.57	112	9.00	8.85
High middle	106	7.70	7.50	108	8.52	8.65	105	7.53	7.04	107	8.67	8.67
Older	105	7.40	6.90	102	8.28	8.16	109	8.05	7.41	113	9.04	8.78

and girls in each age group were combined there was still no evidence that any one age group was consistently favored with the highest achievement score.

Summary. The data presented in Table V, page 34, seem to show no positive evidence that any one age group of boys or girls was able to achieve consistently higher than any other age group. It does not show that older pupils are able to achieve higher in any subject area.

Combined reading and arithmetic achievement. Table VI shows the combined mean achievement grade placement above grade level for all pupils in each age group. This table seems to indicate a more definite pattern of achievement in favor of the younger children; however, there is sufficient interruption in the progression of these scores to make it of doubtful significance.

It should also be pointed out that the children represented in Table VI have a total average of approximately seven and one-half years or sixty-seven months of school experience. The greatest difference in achievement between any group was that which occurred between the reading achievement of the young and high middle groups of boys. This difference was only two and three-tenths months or approximately 3½ per cent.

TABLE VI

COMBINED MEAN ACHIEVEMENT ABOVE GRADE LEVEL FOR ALL PUPILS IN EACH AGE GROUP ENROLLED AT THE NEEDHAM SCHOOL, LODI, CALIFORNIA, AS OF APRIL, 1957

Groups	Mean I.Q. Score	Reading G.P. Above Grade Level	Arithmetic G.P. Above Grade Level
Young	108	.83	.52
Low middle	110	.76	.62
High middle	106	.60	.47
Older	107	.68	.33

The difference between the youngest and oldest groups was only slightly more than 2 per cent.

The mean arithmetic score for the low middle group was highest and, therefore, breaks the progression at a different level from that of the reading.

Summary. The small differences which exist in the level of achievement of the different groups, plus the consistent broken pattern of progression, seem to indicate that there is no definite evidence that chronological age within the age limits set for this study has any bearing on the scholastic achievement of children in Grades VII and VIII.

High ability pupils and the achievement pattern. Table VII shows the reading and arithmetic achievement grade placement of the seventh and eighth grade boys who were in the high ability (107 Intelligence quotient and above) group. There appears to be even less conformity to any pattern in this table than in any of the previous ones, although the children included in these data were those in the high ability group and, therefore, were all capable of working at or above grade level.

Table VII shows a very high achievement in reading for both the young seventh and eighth grade groups. The arithmetic achievement was high for the young eighth grade

TABLE VII

READING AND ARITHMETIC ACHIEVEMENT SCORES OF SEVENTH AND EIGHTH GRADE BOYS IN THE HIGH ABILITY GROUP ENROLLED AT THE NEEDHAM SCHOOL, LODI, CALIFORNIA, AS OF APRIL, 1957

Group	Seventh Grade			Eighth Grade			Combined Total Achievement above Grade Level		
	No.	Read.	Arith	No.	Read.	Arith.	No.	Read.	Arith.
Young	6	9.20	7.8	4	10.35	10.35	10	2.26	1.42
Low middle	9	7.58	7.44	13	9.31	9.16	22	1.02	.86
High middle	17	8.69	8.17	11	9.70	9.67	28	1.33	1.36
Older	7	8.50	7.65	9	9.38	9.05	16	1.43	.87

groups, but it was low for the young seventh graders. The eighth grade boys in the young groups achieved highest in reading. The next older group had the lowest reading score. The combined total achievement above grade level was 2.26 months for the young group and 1.02 months for the next older group. The two oldest groups achieved lower than the young group but higher than the low middle group.

There are four eighth grade boys in this group with a mean Intelligence quotient of 132. Six boys in the young seventh grade group have a mean Intelligence quotient of 124.

Summary. When the variable Intelligence quotient was controlled by including only those pupils in the high ability group, their combined total achievement for each age group of boys shows the same broken pattern of achievement noted in earlier tables. It also fails to show that being older is accompanied by higher scholastic achievement.

A study of these data show no conclusive evidence that the chronological age of any group is affecting the scholastic achievement of that group.

Superior achievement for the young group. The investigator has stated earlier that there appears to be a higher achievement indicated for the young group. However, it has also been pointed out that this group is the smallest group included in this study.

By combining the achievement grade placement of the seventh grade boys who were retained and the young eighth grade boys, an interesting change in total grade placement for this age group occurs.

There were seven seventh grade boys who were between the ages of twelve years and nine months and thirteen years of age, and who were not included in the four age groups set up for this study. These boys were retained once in their school careers. If they had not been retained, they would now be in Grade VIII and, therefore, included in the young eighth grade group.

Table VIII shows the mean Intelligence quotient score, mean reading grade placement, and mean arithmetic grade placement for the seventh grade boys who were too old to be included in the seventh grade groups. Table VIII also shows the Intelligence quotient scores and achievement grade placement for the young eighth grade group.

The eighth grade boys had a mean Intelligence quotient score of 112. These boys have done very well in school and were achieving at least as well as, or possibly above,

TABLE VIII

READING AND ARITHMETIC GRADE PLACEMENT AND MEAN INTELLIGENCE QUOTIENT SCORES FOR SEVENTH AND EIGHTH GRADE BOYS OF THE SAME AGE ENROLLED AT THE NEEDHAM SCHOOL IN LODI, CALIFORNIA, AS OF APRIL, 1957

	Number	Mean I. Q.	Reading G. P.	Arithmetic G. P.
Seventh grade boys retained; age 12 yrs. 9 mos. to 13 yrs.	7	95	6.60	6.10
Eighth grade boys in young group; age 12 yrs. 9 mos. to 13 yrs.	9	112	8.93	9.02
Seventh and eighth grade combined	16	105	8.20	7.70

the older children in the same class.

The seventh grade boys had a mean Intelligence quotient score of 95. These boys were of the same age as the nine boys in the eighth grade class when they started first grade, but due to their low mental ability were not able to make satisfactory achievement in subsequent grades and were, therefore, retained. Had these boys been permitted to continue in the class they originally started with, the mean Intelligence quotient score of the low eighth grade group would now be 105 instead of 112.

The reading and arithmetic scores for these two groups are not entirely comparable because the seventh grade boys have not had the same opportunity as the eighth grade boys to learn some of the work on which they were tested, since they did not spend a year in Grade VII as did the eighth grade boys.

However, assuming there is justification for a comparison, it is noted that by combining the achievement scores the reading grade placement is reduced from 8.93 to 8.20 and the arithmetic score is reduced from 9.02 to 7.70.

From the data presented it would appear that if there is a higher level of achievement in the young group it may well be explained by the fact that many of the children with a low mental ability in the original eighth grade class were retained sometime in their school careers.

The more capable pupils are still in the young eighth grade group.

Summary. A comparison of the combined achievement scores for reading shows that the young group of children had the highest scores. The mean above grade level achievement for the young group in reading was 8.3 months. The next older group was achieving 7.6 months above grade level and the high middle group's achievement was 6.0 months above grade level. The oldest group's record, however, broke the progression with 6.8 months above grade level achievement.

In arithmetic the low middle group achieved highest with 6.2 months above grade level, the young group's performance was 5.2 months above grade level, and the high middle and older group's achievement score was 4.7 months and 3.3 months, respectively, above grade level.

With these two exceptions, these data show a progressively poorer achievement as the age of the children increases. The difference in achievement, however, is not only small, but it also shows a broken pattern of decreasing achievement as the age increases. This same inconsistency was evident in all the data compared in this chapter.

II. COMPARISON OF CHRONOLOGICAL AGE AND SCHOLASTIC ACHIEVEMENT DIFFERENCES BETWEEN BOYS AND GIRLS

Differences in reading and arithmetic achievement for boys and girls. It has already been pointed out that there is little difference between the achievement of one age group of girls or boys as compared to that of older or younger groups of boys or girls. There is no definite pattern indicating consistently higher or lower scholastic achievement for any age group. The data show, however, that the combined achievement for all the girls was somewhat higher than the achievement for the boys.

The results of Table IX indicate that in both reading and in arithmetic for both the seventh and eighth grade pupils, the girls achieved higher than the boys although the difference in achievement is less than three months.

The mean reading score for boys in Grade VII was 7.56 as compared with 7.76 for girls. This difference is only 2.2 months.

The difference in arithmetic scores for the two sexes was 2.6 months. The eighth grade differences were 2.1 for both reading and arithmetic.

Age differences between boys and girls in Grades VII and VIII. The achievement for the girls was slightly higher than that for the boys but their mean chronological age was

TABLE IX

MEAN CHRONOLOGICAL AGE AND MEAN READING AND ARITHMETIC SCORES FOR BOYS AND GIRLS IN THE SEVENTH AND EIGHTH GRADES ENROLLED AT THE NEEDHAM SCHOOL IN LODI, CALIFORNIA, AS OF APRIL, 1957

	Boys Mean		Girls Mean	
	Achievement	Age	Achievement	Age
Seventh Grade: Reading	7.56	12 yrs. 3.1 mos.	7.78	12 yrs. 1.9 mos.
Seventh Grade: Arithmetic	7.24		7.30	
Eighth Grade: Reading	8.63	13 yrs. 3.28 mos.	8.84	13 yrs. 2.56 mos.
Eighth Grade: Arithmetic	8.60		8.81	

lower.

Table IX, page 45, shows that the mean chronological age for boys in Grade VII was 12 years 3.1 months as compared to the mean chronological age of 12 years 1.9 months for the girls.

A similar difference occurs in Grade VIII where the mean chronological age for boys was 13 years 3.28 months as compared to 13 years 2.56 months for girls.

Summary. These data show that the seventh grade girls' reading achievement was 2.2 months above that of the boys. In arithmetic the seventh grade girls achieved 2.6 months higher than the boys. The eighth grade girls achieved 2.1 months higher than the boys in both reading and arithmetic.

Differences in reading and arithmetic achievement for boys and girls of the same age group. Table X shows irregularities in the pattern of achievement for each age group similar to those noted in Table V, page 34. The boys in the young groups had the highest achievement in reading. They scored an average of 10.7 months above grade level. This is about four months higher than the achievement for the high middle group whose score was 6.2 months above grade level.

In arithmetic the highest scores were made by the

TABLE X

ABOVE GRADE LEVEL ACHIEVEMENT IN READING AND ARITHMETIC FOR EACH GROUP OF BOYS AND GIRLS ENROLLED AT NEEDHAM SCHOOL, LODI, CALIFORNIA, AS OF APRIL, 1957

Group	Boys			Girls		
	No. in Group	Read.	Arith.	No. in Group.	Read.	Arith.
Young	20	1.07	.55	36	.64	.44
Low middle	37	.50	.10	61	.91	.72
High middle	57	.62	.56	44	.60	.35
Older	39	.33	.04	36	1.04	.65
Mean above grade level achievement	153	.58	.31	177	.81	.55

young and high middle groups. A look at all the scores in reading and arithmetic for boys seems to indicate that the young group and high middle group made the best achievement record. The girls' highest scores were made by the low middle and older groups with 9.1 and 10.4 months above grade level in reading and 7.2 and 6.5 months above grade level in arithmetic.

The mean achievement in reading for the girls in all four groups was 8.1 months above grade level as compared to 5.8 months for boys. This is 2.3 months higher for girls.

The mean above grade level achievement in arithmetic is 5.5 months for girls and 3.1 months for boys. This is 2.4 months higher for girls.

Seventh and eighth grade pupils have been in school approximately sixty-seven months since they started school in Grade I. A 2.4 months' lead in achievement is slightly more than a 3 per cent gain in seven and one-half years of school experiences.

Summary. There is no conclusive evidence from the data presented that one age group of girls achieved consistently higher or lower than the boys of the same age. For example, the youngest boys were able to achieve 4.3 months higher than the girls of the same age in reading, but the girls in the low middle group's achievement in

reading was 4.1 months higher than that for the boys of the same age group.

The total mean above grade level achievement for girls was 2.3 months higher in reading and 2.4 months higher in arithmetic than that achieved by the boys. This shows approximately a 3 per cent higher achievement for girls on the seventh or eighth grade level.

Per cent of boys and girls in each age group. A comparison of the number of boys and girls in each of the four groups is presented in Table XI. It is noted that the young age group has more girls than boys, but there were more boys in the older age groups. Approximately 13 per cent of the young group were boys, and about 20 per cent were girls. The low middle group was made up of about 24 per cent boys and 34 per cent girls. Beginning with the high middle group the pattern is reversed by approximately the same proportion. There were about 37 per cent of the boys in this group, but only 25 per cent were girls. This trend of more boys than girls continues in the older group.

Stated in another way, 50 per cent of the girls were in the youngest two groups, but only 23 per cent of the boys were in these two groups. The oldest groups had 62 per cent of the boys but only 45 per cent of the girls.

TABLE XI

NUMBER AND PER CENT OF BOYS AND GIRLS IN EACH AGE GROUP ENROLLED AT THE NEEDHAM SCHOOL, LODI, CALIFORNIA, AS OF APRIL, 1957

Group	Boys	Per Cent	Girls	Per Cent
Young	20	13	36	20
Low middle	37	20	61	34
High middle	57	37	44	25
Older	39	25	36	20

Summary. A comparison of the achievement in reading and arithmetic for boys and girls shows that the mean reading achievement for girls was 8.1 as compared to 5.8 months above grade level for boys. The mean above grade level arithmetic achievement was 5.5 months for girls and 3.1 months for boys.

A comparison of the achievement of boys and girls in each age group shows no regular pattern of higher or lower achievement for any one group. It appears that any age group of boys or girls is likely to achieve either high or low in either reading or arithmetic or in both subjects.

The chronological age limit for boys and girls set for this study was the same. However, there were more girls in the younger groups than boys. The mean chronological age for seventh grade boys was 1.2 months older than girls. The eighth grade boys were .72 months older than the girls.

A careful study of these data seems to reveal that the girls in the seventh and eighth grade classes at the Needham School were .967 months younger than the boys, but their scholastic achievement was 2.3 months higher in reading and 2.4 months higher in arithmetic.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary. This study was attempted in order to determine the following: (1) if there is a difference in the reading achievement and arithmetic achievement among four age groups of seventh and eighth grade children at the Needham School; (2) if the achievement of boys is equal to that of the girls of the same age.

A review of previous studies shows that there is considerable difference in the conclusions of those studies. Some educators who have conducted research on these subjects found that chronological age is significant in determining the degree of success in scholastic achievement. Other studies show that age in itself is unimportant.

There were 330 seventh and eighth grade pupils enrolled at the Needham School for whom standardized achievement test results and Intelligence quotient scores were available. The children were all between the ages of eleven years and nine months and twelve years and nine months in Grade VII and twelve years and nine months and thirteen years and nine months in Grade VIII.

The data presented seems to indicate the following: (1) that there is no one age group of either boys or girls which consistently achieve highest in any subject area;

(2) that when the achievement scores of children with high ability are compared the results are similar to those found when scores of all pupils are compared; (3) that the girls are .967 months younger and achieve approximately 2.35 months higher than the boys; (4) that one age group of boys or girls is not necessarily more able to achieve higher scores than an older or younger group.

Conclusions. The most conclusive evidence revealed by this study is that the data presented does not show that chronological age is an important factor in determining success or failure in school. It does not show that the older pupils are able to achieve higher in any subject area.

The data presented on sex difference seem to show that girls have a slight advantage over the boys in the ability to achieve in academic subjects; however, children of the same chronological age differ widely in their ability, and in the final analysis, each child must be considered individually.

Recommendations. There is need for more controlled research in this area. As a result of this study the investigator believes that an adequate study of this kind must be carried on over a period of seven or eight years.

Pupils should be selected when they start school in Grade I and studied as they progress through the elementary school. A sufficient number of cases should be selected to insure a large sample by the time these children are in Grades VII and VIII.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. BOOKS

Breckenridge, Marian E., and E. Lee Vincent. Child Development Physical and Psychological Growth Through The School Years. Philadelphia: W. B. Saunders Company, 1949.

B. PERIODICALS

Ammons, M. P., and J. I. Goodlad. "When to Begin: Dimensions of the First Grade Entrance Age Problem," Childhood Education, 32:21-6, September, 1955.

Blumenthal, Frances. "A Study of the Correlation of Pupil Ability with Chronological Age," Educational Administration and Supervision, 35:279-94, May, 1949.

Carter, L. B. "Effect of Early School Entrance on the Scholastic Achievement of Elementary School Children in the Austin Public Schools," Journal of Educational Research, 50:91-103, October, 1956.

Douglas, Harl R. "Sex Differences in Secondary School Mathematics," The Mathematics Teacher, 30:21-2, January, 1937.

Forester, John J. "At What Age Should a Child Start School," The School Executive, 74:80-81, March, 1955.

Hobson, James R. "Mental Age As a Workable Criterion for School Admission," Elementary School Journal, 48:312-21, February, 1945.

Johnson, George R. "Girls Do Better Than Boys in School," School and Society, 47:313-14, March, 1938.

King, Inez B. "Effect of Age of Entrance Into Grade I Upon Achievement in Elementary School," Elementary School Journal, 55:331-36, February, 1955.

Lennon, Roger T., and Blythe C. Mitchell. "Trends in Age-Grade Relationship: A 35-Year Review," School and Society, 82:123-25, October 15, 1955.

McCandless, B. R. "Should a Bright Child Start to School Before He's Five?" Education, 77:370-75, February, 1957.

Miller, Vera V. "Academic Achievement and Social Adjustment of Children Young for Their Grade Placement," The Elementary School Journal, 57:257-63, February, 1957.

Pauly, Frank R. "Should Boys Enter School Later Than Girls?" National Education Association Journal, 41:29-31, January, 1952.

_____. "Sex Differences and Legal School Age," Journal of Educational Research, 45:1-9, September, 1951.

Smith, M. B. "Comparison of the School Progress of Boys and Girls in American Public Schools," Southwestern Social Science Quarterly, 28:303-12.

Winker, James B. "Age Trends and Sex Differences In The Wishes, Identifications, Activities and Fears of Children," Child Development, 20:191-200, December, 1949.

C. PUBLICATIONS OF THE GOVERNMENT, LEARNED SOCIETIES, AND OTHER ORGANIZATIONS

State of California, Department of Education. California Administrative Code, Title 5, Article I, Sections 8503 and 8505. Sacramento: Division of Administrative Procedure.

D. UNPUBLISHED MATERIALS

Baer, Clyde. "A Comparison of the School Progress and Social Adjustment of Underage and Overage Pupils of Comparable Intelligence during Eleven Years in School." Kansas City, Missouri: Kansas City Public Schools, (n.d.).

Lodi District Chamber of Commerce. "Standard Industrial Survey Summary Report." Lodi, California: Lodi District Chamber of Commerce, 1957.

Lodi Elementary Schools. "Handbook for Teachers." Lodi, California: 1957. 22 p.

Lodi Elementary School District Assistant Superintendent's Office. Student Enrollment and Registration Records. Lodi, California: 1956-1957.

St. Anne's School, Office of the Principal, Lodi, California.

St. Peters Lutheran School, Office of the Principal, Lodi, California.

Seventh Day Adventist Elementary School, Office of the Principal, Lodi, California.

Woods Elementary School District Superintendent's Office. Student Enrollment and Registration Records. Woodbridge, California: 1956-1957.

E. TESTS

Sullivan, Elizabeth T., and others. California Short-Form Test of Mental Maturity, Elementary Grades, S-Form. Los Angeles: California Test Bureau, 1950.

Tiegs, Ernest W., and Willis W. Clark. California Achievement Tests, Forms AA and BB. Los Angeles: California Test Bureau, 1950.

APPENDIX

Name _____ Birthdate _____ Age _____

Age September 1, 1956 Years _____ Months _____

Reading Test Grade Placement _____ Value _____

Arithmetic Test Grade Placement _____ Value _____

Intelligence Quotient _____

Number of years in school since Kindergarten _____